

78575
Ilmenite Basalt
140 grams



Figure 1: Photo of 78575. Sample is 5 cm across. S73-31350

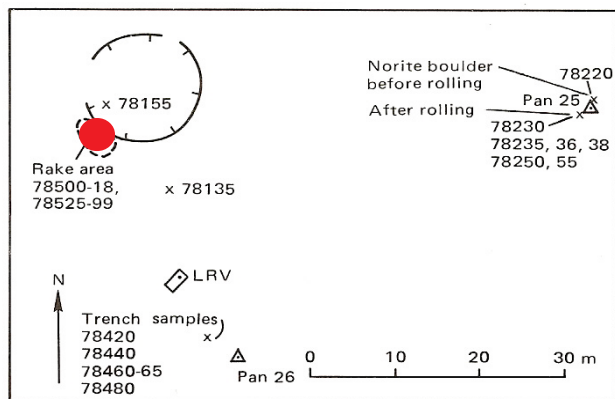


Figure 2: Location where 78575 was found.

Introduction

78575 is a well-rounded granular high-Ti basalt with low Rb content (figure 1). It is from a rake sample collected as part of a large comprehensive sample at station 8, Apollo 17 (figure 2).

Petrography

78575 is termed an “allotrimorphic-granular ilmenite basalt” by Warner et al. (1978). In any case, 78575 is a relatively coarse-grained basalt with long tabular plagioclase crystals separating clusters of ilmenite and pyroxene crystals (figure 4). Armalcolite, tranquillityite and zirconolite are reported (Warner et al. 1978). Pyroxene tends to form in clusters and has

Mineralogical Mode

Olivine	tr.
Pyroxene	51.5
Plagioclase	29.9
Opagues	16.5
Silica	1.8
Meostasis	0.4

rather complex zoning patterns (figure 3). Ilmenite forms in chains.

The composition of armalcolite is lower in Ti and higher in Fe (table 2).

Chemistry

Warner et al. (1975) first reported the composition, which has generally been confirmed by later analyses (Neal 2001). Neal (2001) found that this basalt had very low Rb, compared with other Apollo 17 basalts (figures 5, 6 and 7).

Radiogenic age dating

Apollo 17 mare basalts are generally considered 3.72 ± 0.04 b.y. old (see Paces et al. 1991).

Processing

There are three thin sections.

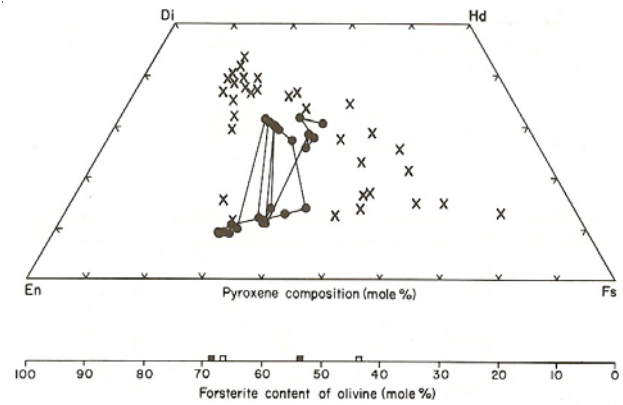


Figure 3: Composition of pyroxene and ilmenite in 78575 (Warner et al. 1978).

Table 2: Armalcolite in 78575.

(Warner et al. 1976)

TiO ₂	69.5	68.7
Al ₂ O ₃	1.35	1.84
Cr ₂ O ₃	1.46	1.28
V ₂ O ₃	0.05	0.06
FeO	18	18.9
MgO	6.6	5.7
CaO	0.78	0.68
ZrO ₂		0.08

Figure 4a,b: Photomicrograph of thin section 78575,6. 2.8 mm across

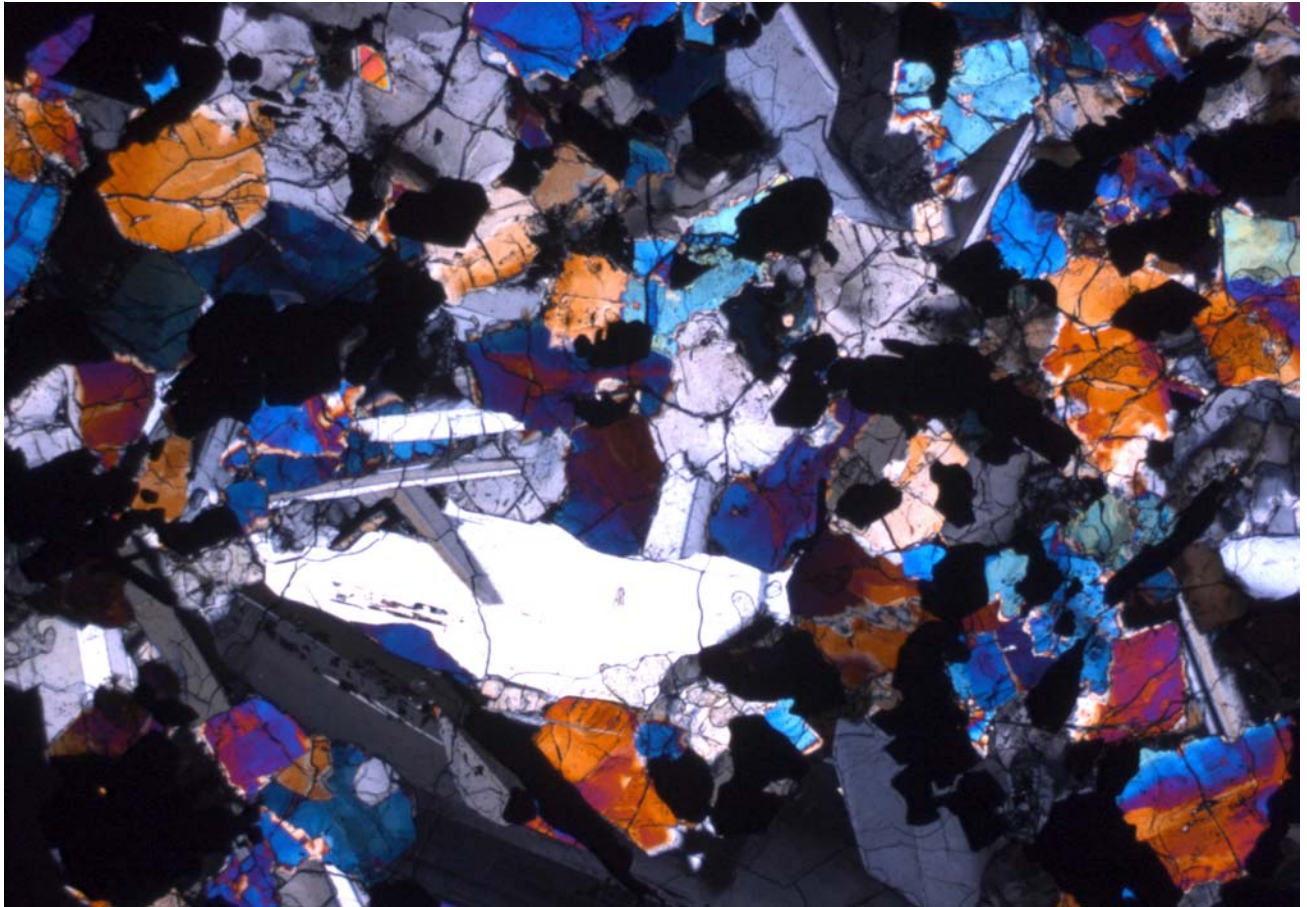
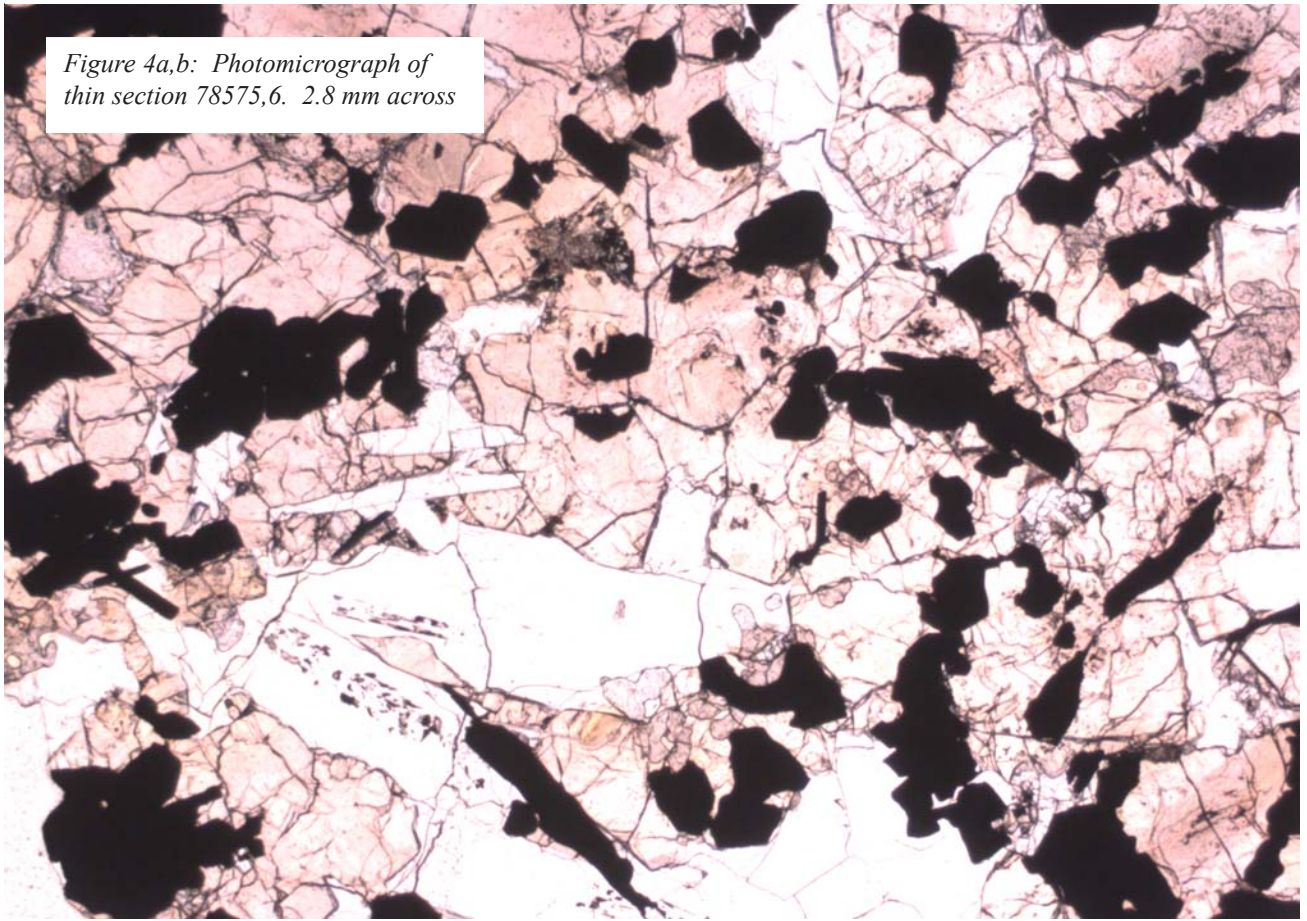


Table 1. Chemical composition of 78575.

reference	Neal2001	Warner75	Warner78
weight			
SiO ₂ %			
TiO ₂		11.8	(c)
Al ₂ O ₃		9	(c)
FeO		17	(c)
MnO		0.216	(c)
MgO		7.5	(c)
CaO		11	(c)
Na ₂ O		0.36	(c)
K ₂ O		0.04	(c)
P ₂ O ₅			
S %			
sum			
Sc ppm	87	(a) 75	(c)
V	79	(a) 100	(c)
Cr	3260	(a)	
Co	21	(a) 16.1	(c)
Ni	3.7	(a)	
Cu	37	(a)	
Zn	89	(a)	
Ga	3.86	(a)	
Ge ppb			
As			
Se			
Rb	0.27	(a)	
Sr	157	(a)	
Y	91	(a)	
Zr	257	(a)	
Nb	23	(a)	
Mo	30	(a)	
Ru			
Rh			
Pd ppb			
Ag ppb			
Cd ppb			
In ppb			
Sn ppb			
Sb ppb	10	(a)	
Te ppb			
Cs ppm			
Ba	69	(a)	
La	5.28	(a) 3.6	(c)
Ce	21.1	(a) 15	(c)
Pr	3.38	(a)	
Nd	22.5	(a)	
Sm	9.16	(a) 6.7	(c)
Eu	1.77	(a) 1.47	(c)
Gd	13.6	(a)	
Tb	2.56	(a) 1.8	(c)
Dy	17.1	(a) 11	(c)
Ho	3.54	(a)	
Er	9.78	(a)	
Tm	1.41	(a)	
Yb	9.74	(a) 6.6	(c)
Lu	1.27	(a) 0.95	(c)
Hf	7.23	(a) 5.4	(c)
Ta	1.43	(a) 1.2	(c)
W ppb	90	(a)	
Re ppb			
Os ppb			
Ir ppb			
Pt ppb			
Au ppb			
Th ppm	0.3	(a)	
U ppm	0.1	(a)	
technique:		(a) ICP-MS, (c) INAA	

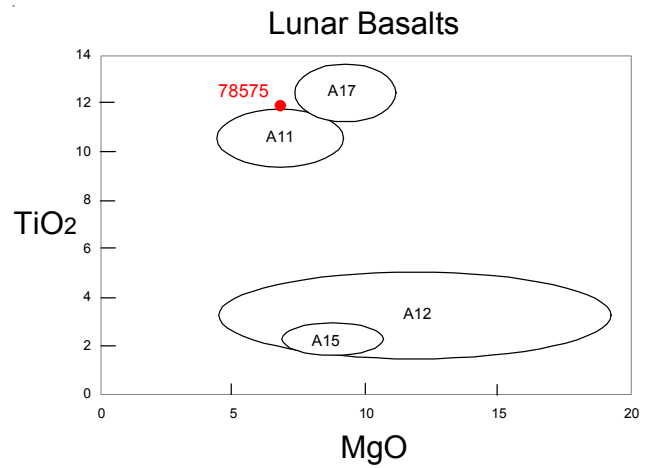


Figure 5: Composition of lunar basalts.

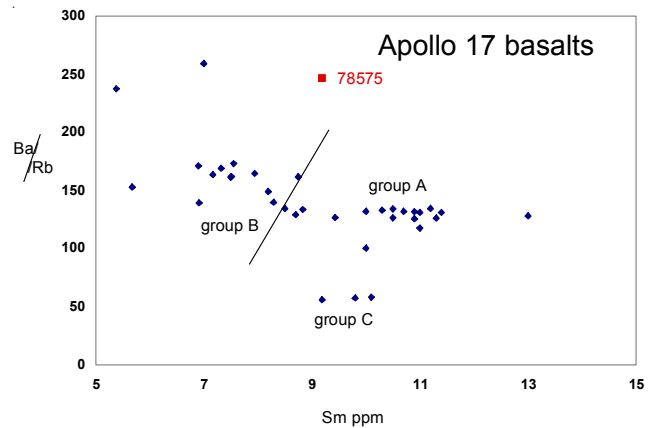


Figure 6: Trace element characteristics of Apollo 17 basalts.

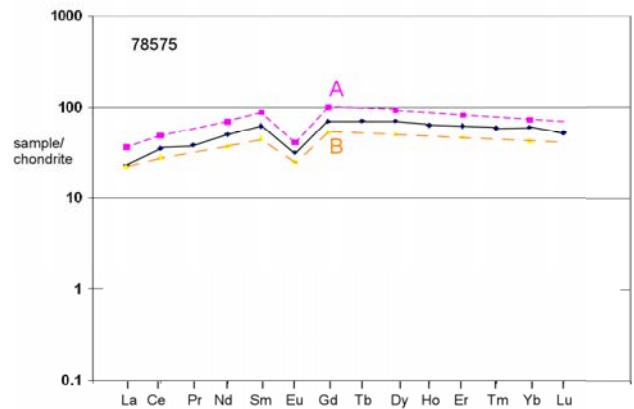
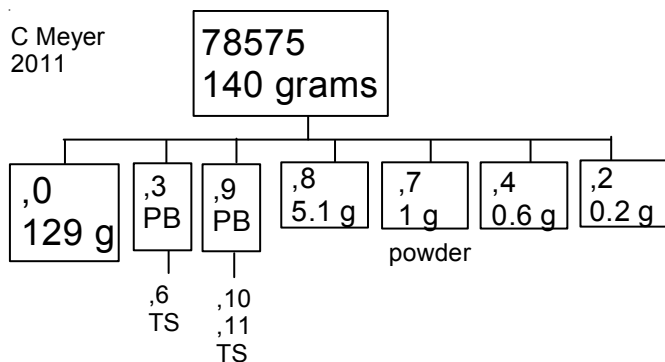


Figure 7: Normalized rare-earth-element diagram for 78575 compared with A and B types of Apollo 17 basalt.



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